



U.S. Department of Energy  
Energy Efficiency and Renewable Energy

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# Stage Gate Management Process and Expectations

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- Stage Gate Evolution
  - Product Development
  - Process Technology Development
    - Commercial Path – Stage 1-5
    - Research Path – Stages A, B, C
  - OBP Version
- Stage Work Categories, Criteria, Gates
- What Stage Gate Does for OBP
- Expectations for this Meeting



# Goal of OBP Stage Gate Process

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**Bring biomass science and technology to commercial application sooner, at lower cost, and with improved probability of success.**

Through:

- Strong Customer/Competition orientation
- Better homework up-front
- Quality of execution
- Sharper focus, better prioritization
- Fast-paced, parallel processing
- Multifunctional team approach

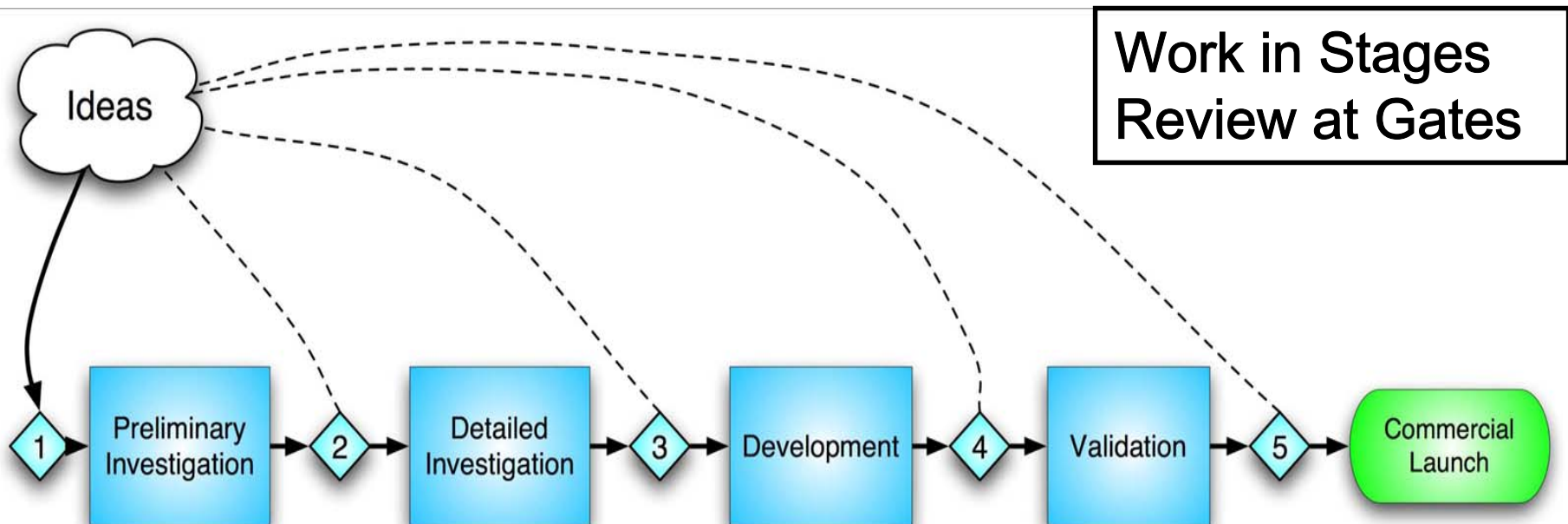
**Designed to be Consistent with EERE Peer Review and Answer OMB R&D Investment Criteria ?s<sup>3</sup>**



# What is stage gate? Version # 1

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- A management framework first described ~1985
- Originally proposed by Robert Cooper (Winning at New Products) as a model for product development projects to reduce costs and time to market

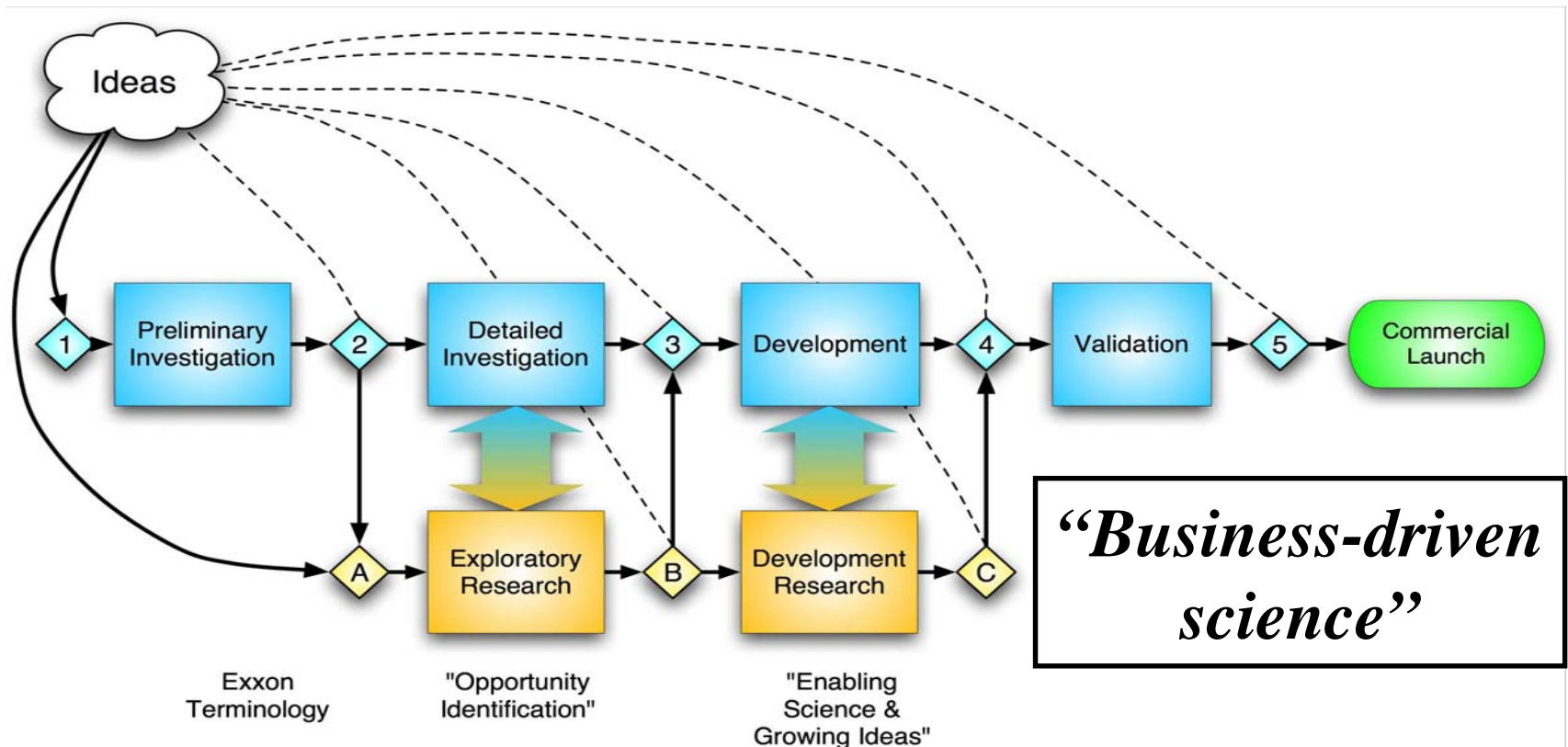




# What is stage gate? Version # 2

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- Adapted and extended to basic research by process R&D organizations for process technology development
  - Exxon, Rohm and Haas, Eastman Chemical





# Commercial Path – Blue Line

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- Project is defined well enough to envision a completed technology or technology improvement
- Development activities proceeding toward commercialization in 1 of 5 stages:
  1. Preliminary Investigation – homework only, no lab
  2. Detailed Investigation – lab scale, indiv. unit ops
  3. Development – lab + pilot scale, integration
  4. Validation – Demonstration scale facilities
  5. Commercial Launch



# Research Path – Orange Line

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### Learning Stages

- Provide scientific underpinnings for new industry direction
- Goals and deliverables based on learning
- Longer term, considerable unknowns
- Results enable & contribute to a defined project(s)
- **Stage A: Exploratory Research**
  - What are the right questions?
  - What are the best approaches to answer those questions?
- **Stage B: Development Research**
  - Develop scientific capability to enable us to answer the important questions

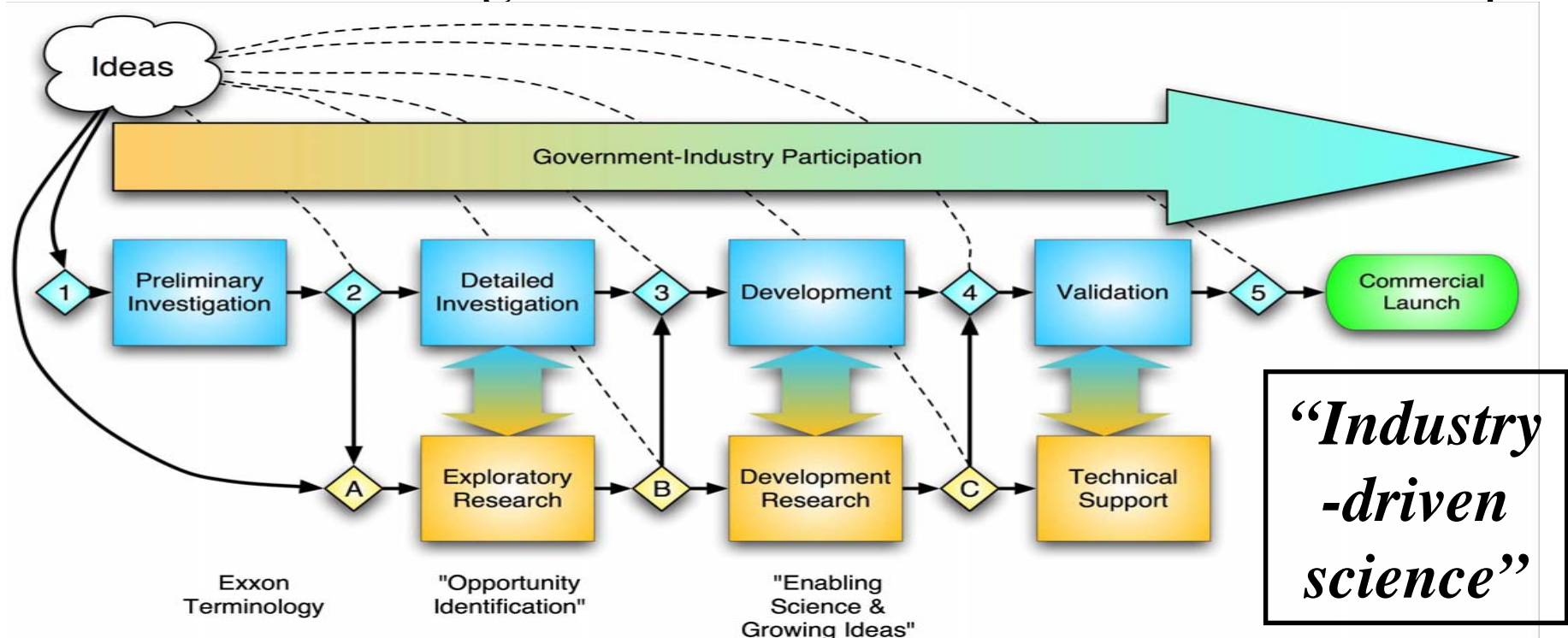




# What is stage gate? OBP Version

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- Modified by Biomass Program (1998) for early stage, high risk government-funded technology R&D to insure alignment with industry needs for later stage development and commercialization
- Now being extended to Public-Private Partnerships







# 4 Work Categories in Each Stage

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- Market/Customer Assessment
  - Research, Development, Demonstration Activities
    - *vast majority of \$ spent here*
  - Competitive Technology/Detailed Technical Assessment
  - Financial Assessment
- ❖ **Result: Decisions and priorities regarding R, D &D are informed relative to market/customer, competition, and economics.**



# Gate Decision Criteria: 7 Dimensions

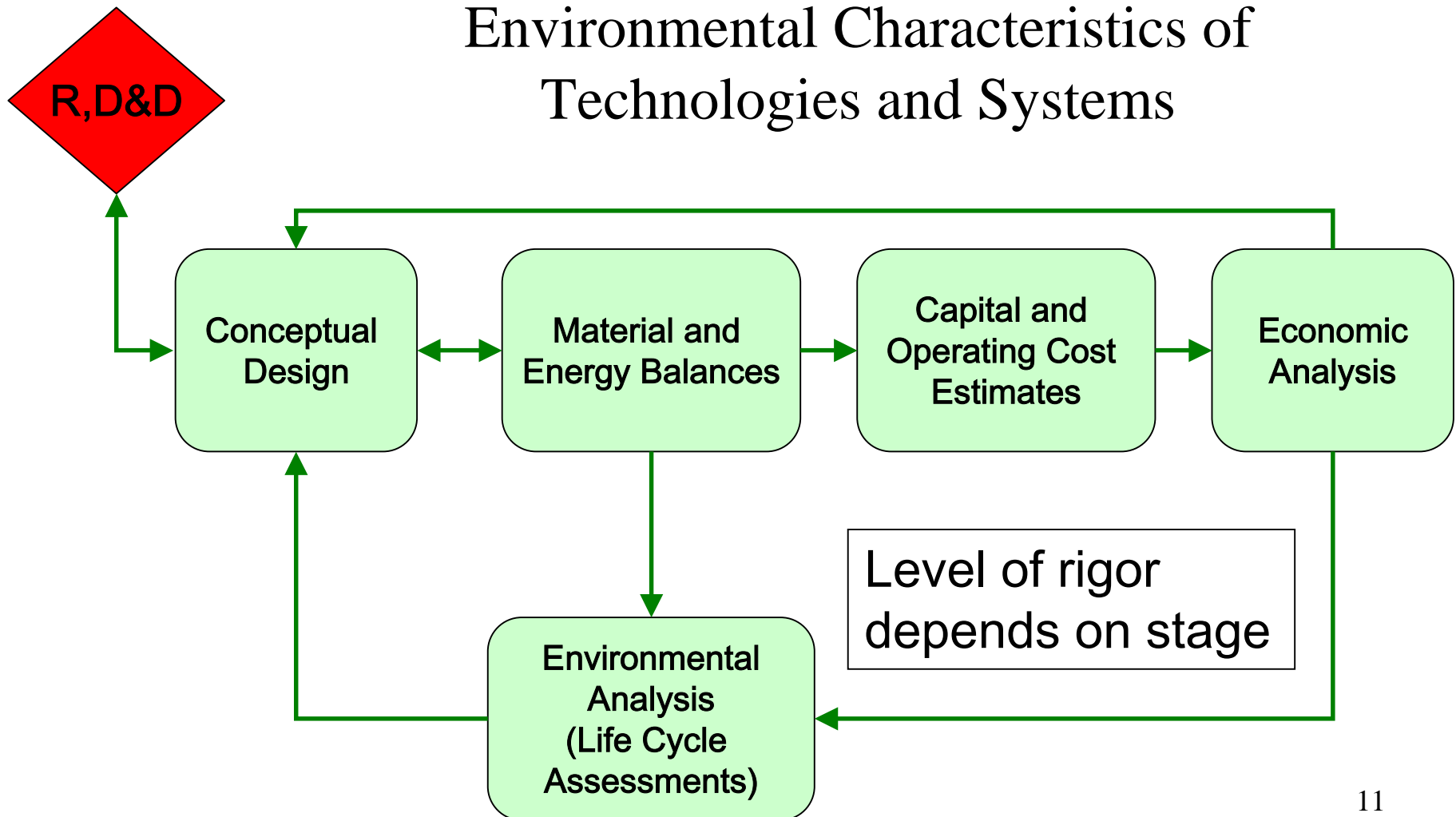
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1. **Strategic Fit (look to OBP MYTP, EERE Plans)**
2. **Market/Customer**
3. **Technical Feasibility and Risks**
4. **Competitive Advantage**
5. **Environmental, Legal, Regulatory Compliance**
6. **Critical Success Factors and Showstoppers**
7. **Plan to Proceed**

Reviewers include  
Industry and Peers, DOE

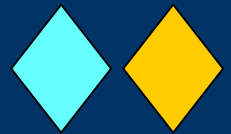
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# Estimating Competitive Advantage and Environmental Characteristics of Technologies and Systems





# Gate Review Outcomes



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- Make an informed decision on the future of the project - Go, Hold, Recycle, or Kill
  - We have had all of these outcomes.
  - Experience - a project is often realigned based on the outcome of a gate review and the revised project plan is given a “Go” or “Recycle”.
- Gatekeepers for early stages have a role as nurturers of new technology development.
  - Reviewers help identify priorities and improve project plan to proceed.



# What does OBP stage gate do?

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- Aligns R&D project objectives with OBP Goals
- Provides high-level project definition including guidance on scope, quality, outputs, and integration.
  - Plans incorporate performance indicators, decision points, off-ramps...
- Annual Interim Reviews evaluate progress and continuing fit for projects in a stage more than 1 year
  - New Interim Stage Review format is consistent with EERE Program Peer Review requirements
- Enables Portfolio Management decisions
  - Value, balance, number of projects...



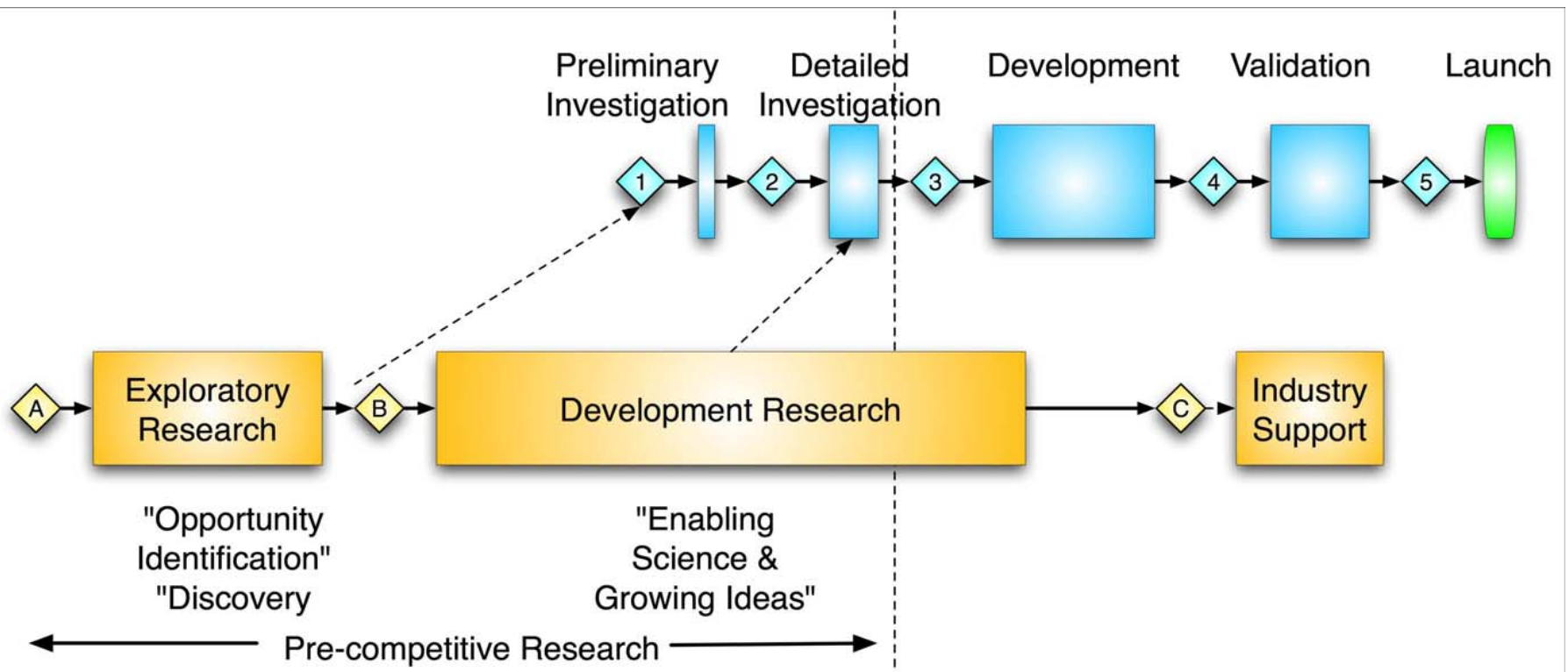
# What does OBP stage gate do?

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**Helps define interfaces of Public, Private, and Joint Public-Private research, development, demonstration and deployment activities**

## **OBP Strategy:**

- Core pre-competitive research to “enable” expanded bioindustry
- D, D & D through Public-Private Partnerships







# Review Expectations

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- 1. Reviewers: Projects** - Are they being done right?
  - A. Project relevance, approach, and priorities against appropriate criteria
  - B. Progress/accomplishments compared to plans
  - C. Proposed stage(s) of development
  - D. Proposed next steps, including plans to proceed
- 2. Reviewers: Thermochemical Conversion Portfolio** - Are the right projects being done?
- 3. Audience: Feedback on Projects and Portfolio**



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- Summary and Analysis of Evaluation Data
- Review Report
  - Project specific composite scores and comments
    - Nothing ascribed to specific reviewers
  - Reviewers may check for accuracy
- Program Response
  - Identify follow-up actions, if any
- Publish Report with Program Response
  - Post on Biomass Program Web site
- Incorporate findings in OBP Peer Review
  - Scheduled for November 2005